IN THE CLAIMS:

Please cancel claims 425-430 without prejudice or disclaimer and add new claims 433-489 as shown below.

1-424. (Previously cancelled)

425-430. (Currently cancelled)

431-432. (Previously cancelled)

433. (New) A method of nanofabrication comprising

providing at least one type of linking oligonucleotide having a selected sequence, the sequence of each type of linking oligonucleotide having at least two portions;

providing one or more types of nanoparticles having oligonucleotides bound thereto, wherein the oligonucleotides are present on a surface of the nanoparticles at a surface density of at least 10 picomoles/cm^2, at least some of the oligonucleotides on each type of nanoparticles comprise at least one type of recognition oligonucleotides, each type of recognition oligonucleotides comprises a spacer portion and a recognition portion, the spacer portion being designed so that it is bound to the nanoparticles, the recognition portion comprises a sequence complementary to at least a portion of the sequence of a specific type of linking oligonucleotide; and

contacting the linking oligonucleotides and nanoparticles under conditions effective to allow hybridization of at least a portion of the oligonucleotides on the nanoparticles to the linking oligonucleotides so that a desired nanomaterial or nanostructure is formed.

434. (New) The method of Claim 433 wherein the linking oligonucleotide is single-stranded.

435. (New) The method of Claim 433 wherein the linking oligonucleotide is double-stranded and has overhanging ends.

436. (New) The method of Claim 433 wherein the linking oligonucleotide is a triple-stranded oligonucleotide connector.

437. (New) The method of Claim 433 wherein the linking oligonucleotide comprises a peptide nucleic acid chain.

438. (New) A method of nanofabrication comprising:

providing at least two types of nanoparticles having oligonucleotides bound thereto wherein the oligonucleotides are present on a surface of the nanoparticles at a surface density of at least 10 picomoles/cm^2, wherein at least some of the oligonucleotides on each type of nanoparticles comprise one or more types of recognition oligonucleotides, each type of recognition oligonucleotides comprises a spacer portion and a recognition portion, the spacer portion being designed so that it is bound to the nanoparticles,, at least one type of recognition oligonucleotides on a first type of nanoparticles comprises a recognition portion having a sequence complementary to at least a portion of the oligonucleotides on a second type of nanoparticles and at least one type of recognition oligonucleotides on the second type of nanoparticles comprises a recognition portion having a sequence complementary to at least a portion of the oligonucleotides on the first type of nanoparticles; and

contacting the first and second types of nanoparticles under conditions effective to allow hybridization of at least a portion of the oligonucleotides on the nanoparticles to each other so that a desired nanomaterial or nanostructure is formed.

439. (New) The method of any one of Claims 433 or 438 wherein the oligonucleotides are attached to the nanoparticles in a stepwise ageing process comprising (i) contacting the oligonucleotides with the nanoparticles in a first aqueous solution for a period of time sufficient to allow some of the oligonucleotides to bind to the nanoparticles; (ii) adding at least one salt to the first aqueous solution to create a second aqueous solution; and (iii) contacting the oligonucleotides and nanoparticles in the second aqueous solution for an additional period of time to enable additional oligonucleotides to bind to the nanoparticles.

440. (New) The method of Claim 439 wherein the second aqueous solution has an ionic strength sufficient to overcome at least partially the electrostatic attraction or repulsion of the oligonucleotides for the nanoparticles and the electrostatic repulsion of the oligonucleotides to each other.

441. (New) The method of Claim 439 wherein the oligonucleotides and nanoparticles are contacted in aqueous solution for about 12 to about 24 hours.

442. (New) The method of Claim 439 wherein salt is added to the aqueous solution to form the aqueous salt solution which is buffered at pH 7.0 and which contains about 0.1 M NaCl.

443. (New) The method of Claim 439 wherein the oligonucleotides and nanoparticles are contacted in the aqueous salt solution for an additional 40 hours to increase the density of oligonucleotides bound to the nanoparticles.

444. (New) The method of Claim 442 wherein the salt is added to the first aqueous solution in a single addition.

445. (New) The method of Claim 442 wherein the salt is added gradually to the first aqueous solution over time.

446. (New) The method of Claim 442 wherein the salt is selected from the group consisting of consisting of sodium chloride, magnesium chloride, potassium chloride, ammonium chloride, sodium acetate, ammonium acetate, a combination of two or more of these salts, one of these salts in a phosphate buffer, and a combination of two or more these salts in a phosphate buffer.

447. (New) The method of Claim 446 wherein the salt is sodium chloride in a phosphate buffer.

448. (New) The method of Claim 433 or 438 wherein the oligonucleotides are present on the surface of the nanoparticles at a surface density of at least 15 picomoles/cm^2.

449. (New) The method of Claim 448 wherein the oligonucleotides are present on the surface of the nanoparticles at a surface density from about 15 picomoles/cm^2 to about 40 picomoles/cm^2.

450. (New) The method of any one of Claims 433 or 438 wherein the nanoparticles are metal nanoparticles or semiconductor nanoparticles.

451. (New) The method of Claim 450 wherein the nanoparticles are gold nanoparticles.

452. (New) The method of Claim 450 wherein the semiconductor nanoparticles are made of CdSe/ZnS (core/shell).

453. (New) The method of any one of Claims 433 or 438 wherein the spacer portion has a moiety covalently bound to it, the moiety comprising a functional group through which the spacer portion is bound to the nanoparticles.

454. (New) The method of any one of Claims 433 or 438 wherein the spacer portion comprises at least 10 nucleotides.

455. (New) The method of Claim 454 wherein the spacer portion comprises from about 10 to about 30 nucleotides.

456. (New) The method of Claim 454 wherein the bases of the nucleotides of the spacer portion are all adenines, all thymines, all cytosines, all uracils or all guanines.

457. (New) The method of any one of Claims 433 or 438 wherein at least some the oligonucleotides bound to the nanoparticles comprise a type of diluent oligonucleotides.

458. (New) The method of Claim 457 wherein the diluent oligonucleotides contain about the same number of nucleotides as are contained in the spacer portions of the recognition oligonucleotides.

459. (New) The method of Claim 458 wherein the sequence of the diluent oligonucleotides is the same as that of the spacer portions of the recognition oligonucleotides.

460. (New) The method of any one of Claims 433, 438 or 457 wherein the oligonucleotides are bound to the nanoparticles through sulfur linkages.

461. (New) A nanomaterial or nanostructure prepared in accordance with any one of Claims 433-460.

462. (New) A kit comprising

(i) one or more types of linking oligonucleotide having a selected sequence, the sequence of each type of linking oligonucleotide having at least two portions; and

(ii) one or more types of nanoparticles having oligonucleotides bound thereto wherein the oligonucleotides are present on a surface of the nanoparticles at a surface density of at least 10 picomoles/cm^2, at least some of the oligonucleotides on each type of nanoparticles comprise at least one type of recognition oligonucleotides, each type of recognition oligonucleotides comprises a spacer portion and a recognition portion, the spacer portion being designed so that it is bound to the nanoparticles,, and the recognition portion having a sequence complementary to at least a portion of the sequence of a specific type of linking oligonucleotide,

463. (New) The kit of Claim 462 wherein the linking oligonucleotide is single-stranded.

464. (New) The kit of Claim 462 wherein the linking oligonucleotide is double-stranded and has overhanging ends.

465. (New) The kit of Claim 462 wherein the linking oligonucleotide is a triple-stranded oligonucleotide connector.

466. (New) The kit of Claim 462 wherein the linking oligonucleotide comprises a peptide nucleic acid chain.

467. (New) The kit of Claim 462 wherein the oligonucleotides are attached to the nanoparticles in a stepwise ageing process comprising (i) contacting the oligonucleotides with the nanoparticles in a first aqueous solution for a period of time sufficient to allow some of the oligonucleotides to bind to the nanoparticles; (ii) adding at least one salt to the first aqueous solution to create a second aqueous solution; and (iii) contacting the oligonucleotides and nanoparticles in the second aqueous solution for an additional period of time to enable additional oligonucleotides to bind to the nanoparticles.

468. (New) The kit of Claim 467 wherein the second aqueous solution has an ionic strength sufficient to overcome at least partially the electrostatic attraction or repulsion of the oligonucleotides for the nanoparticles and the electrostatic repulsion of the oligonucleotides to each other.

469. (New) The kit of Claim 467 wherein the oligonucleotides and nanoparticles are contacted in aqueous solution for about 12 to about 24 hours.

470. (New) The kit of Claim 467 wherein salt is added to the first aqueous solution to form the second aqueous solution which is buffered at pH 7.0 and which contains about 0.1 M NaCl.

471. (New) The kit of Claim 467 wherein the oligonucleotides and nanoparticles are contacted in the second aqueous solution for an additional 40 hours to increase the density of oligonucleotides bound to the nanoparticles.

472. (New) The kit of Claim 470 wherein the salt is added to the first aqueous solution in a single addition.

473. (New) The kit of Claim 470 wherein the salt is added gradually to the first aqueous solution over time.

474. (New) The kit of Claim 470 wherein the salt is selected from the group consisting of consisting of sodium chloride, magnesium chloride, potassium chloride, ammonium chloride, sodium acetate, ammonium acetate, a combination of two or more of these salts, one of these salts in a phosphate buffer, and a combination of two or more these salts in a phosphate buffer.

475. (New) The kit of Claim 474 wherein the salt is sodium chloride in a phosphate buffer.

476. (New) The kit of Claim 462 wherein the oligonucleotides are present on the surface of the nanoparticles at a surface density of at least 15 picomoles/cm^2.

477. (New) The kit of Claim 476 wherein the oligonucleotides are present on the surface of the nanoparticles at a surface density from about 15 picomoles/cm^2 to about 40 picomoles/cm^2.

478. (New) The kit of Claim 462 wherein the nanoparticles are metal nanoparticles or semiconductor nanoparticles.

479. (New) The kit of Claim 478 wherein the nanoparticles are gold nanoparticles.

480. (New) The kit of Claim 479 wherein the semiconductor nanoparticles are made of CdSe/ZnS (core/shell).

481. (New) The kit of Claim 462 wherein the spacer portion has a moiety covalently bound to it, the moiety comprising a functional group through which the spacer portion is bound to the nanoparticles.

482. (New) The kit of Claim 462 wherein the spacer portion comprises at least 10 nucleotides.

483. (New) The kit of Claim 482 wherein the spacer portion comprises from about 10 to about 30 nucleotides.

484. (New) The kit of Claim 482 wherein the bases of the nucleotides of the spacer portion are all adenines, all thymines, all cytosines, all uracils or all guanines.

485. (New) The kit of Claim 482 wherein the bases of the nucleotides of the spacer portion are all adenines, all thymines, all cytosines, all uracils or all guanines.

486. (New) The kit of Claim 462 wherein at least some the oligonucleotides bound to the nanoparticles comprise a type of diluent oligonucleotides.

487. (New) The kit of Claim 486 wherein the diluent oligonucleotides contain about the same number of nucleotides as are contained in the spacer portions of the recognition oligonucleotides.

488. (New) The kit of Claim 486 wherein the sequence of the diluent oligonucleotides is the same as that of the spacer portions of the recognition oligonucleotides.

489. (New) The kit of Claim 462 wherein the oligonucleotides are bound to the nanoparticles through sulfur linkages.